

University of Technology
Department of Applied Sciences
Final Examination 2016/2017



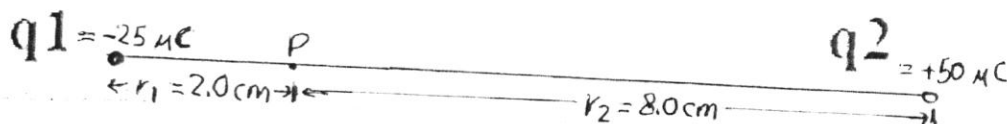
Subject : physics
Branch : الكيمياء التطبيقية
Examiner: ا.م. د. ضحى سعدي

Class : first class
Time : 3 hours
Date : 8/6/2017

Note: answer only 4 questions

Q1 Determine the electrical force (F) of attraction between two balloons that are charged with the opposite type of charge but the same quantity of charge. The charge on the balloons is $6.0 \times 10^{-7} \text{ C}$ and they are separated by a distance of 0.50 m. (12.5 mark)

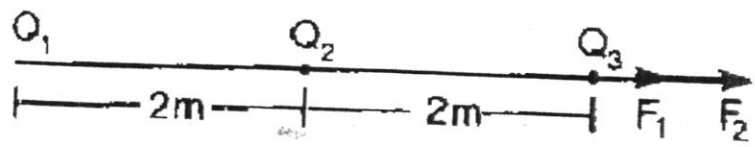
Q2 Two point charges are separated by a distance of 10 cm. one has a charge $-25 \mu\text{C}$ and the other $50 \mu\text{C}$. determine a) the direction and magnitude of the electric field (E) at point (P) between two charges that is 2 cm from the negative charge. b) if an electron of mass ($9.1 \times 10^{-31} \text{ Kg}$) is placed at rest at (P) and then released, what will be its initial acceleration (a). (12.5 mark)

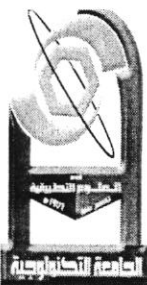


Q3 two point charges of $40 \mu\text{C}$ and $-10 \mu\text{C}$ are separated by distance 10cm. What is the electric field (E) midway between these two charges? (12.5 mark)

Q4 what is meaning Flux and write the equation of Gauss law. (12.5 mark)

Q5 Three charges about $+20 \mu\text{C}$ are placed along a straight line and the distance between these charges is about 2m as shown in figure down find the force (F) on the charge in right end Q_3 . (12.5 mark)





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Subject: Inorganic chemistry
Branch: Applied chemistry
Examiner: L.Sallal AL-Merhj

Class: 1st
Time: 3hr
Date: 29/5/2017

Note : answer four questions only (Each question has 25 marks)

- Q1) a- find the fourth quantum numbers of the last electron and the term symbol for Cr^{+3} (15marks)
- b- determine the frequencies and wave number of electromagnetic radiation of the following wave length, 1-6.0 A , 2- 430 μm . (10marks)
- Q2) a- In the Lyman series, calculate the wave number, wave length and frequency for the lines, n_2 5, 6 Rydberg constant = 109677cm^{-1} . (10marks)
- b- According to M.O.T what are of the following compound is more stable (O_2^{-1} , O_2^{-2})? (15marks)
- Q3) a- explain the following terms (Zeeman effect, Emission spectra, gerade and ungerade, ionization energy, ionic radii) (10marks)
- b- What is Atomic number of the element that its last electron has following quantum numbers, $n=3$, $l=2$, $m_l=-2$, $m_s=+1/2$? (10marks)
- Q4) a- Calculate the effective nucleus charge that the valence electron feel in a copper atom (29) and the last electron in the d-orbital of the same element. (10 Marks)
- b- rearrange the following ions according to decreases of the ionic radius F^{-1} , Si^{+4} , Na^{+1} , Mg^{+2} , Al^{+3} , what is the reason of that? (5 Marks)
- c- b- for the following reaction ($\text{Li} + \frac{1}{2} \text{Br}_2 \rightarrow \text{LiBr}$), draw the Born Haber cycle and interpret all symbols (10 Marks)
- Q5) a- find the hybridization of the following molecule (IF_7 , ClF_5 , NH_3 , CO_2 , IO_3^{-1}) (15marks)
- b- what is the radius of the first Bohr orbit for Li^{++} , $Z=3$? (10marks)

Good luck